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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/514,429

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Robert Dwilinski

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EXAMINER

LOGIE, MICHAEL J

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/514,429	<b>Applicant(s)</b> DWILINSKI ET AL.	
	<b>Examiner</b> MICHAEL J. LOGIE	<b>Art Unit</b> 2881	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-25 is/are pending in the application.  
     4a) Of the above claim(s) 2-7 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 24 and 25 is/are allowed.
- 6) ☒ Claim(s) 1,8,10-13,15-20,22 and 23 is/are rejected.
- 7) ☒ Claim(s) 9,14 and 21 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>See Continuation Sheet</u> .                                  | 6) <input type="checkbox"/> Other: _____                          |

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :11/16/2004,06/29/2005,08/02/2005,10/11/2005,12/19/2005,02/22/2006,05/25/2006,08/29/2006,12/06/2006,02/08/2007,05/08/2007,07/03/2007,11/16/2007,03/13/2008, 06/06/2008.

## **DETAILED ACTION**

### ***Claim Objections***

Claims 9, 14 and 21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The light emitting device configuration was not found in a prior art search. The search failed to show or suggest the prior use of:

- wherein said phosphor substrate has the off- angle between 0.05 and 0.2 degrees in configuration with the limitations of dependent claim 9
- wherein said phosphor substrate contains alkali metals at the concentration of 0.1 ppm or more in configuration with the limitations of dependent claim 14
- The phosphor layer comprises a nitride phosphor activated by at least one element of rare earth selected from the group consisting of Y, La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er and Lu, and contains N and at least one element of Group II selected from the group consisting of Be, Mg, Ca, Sr, Ba and Zn, and at least one element of Group IV selected from the group consisting of C, Si, Ge, Sn, Ti, Zr and H in configuration with the limitations of dependent claim 21.

### ***Allowable Subject Matter***

Claims 24 and 25 are allowed.

The phosphor substrate configuration was not found in a prior art search. The search failed to show or suggest the prior use of:

- wherein said phosphor substrate contains alkali metals at the concentration of 0.1 ppm or more in configuration with the limitations of dependent claim 24
- wherein said phosphor substrate has the off- angle between 0.05 and 0.2 degrees in configuration with the limitations of dependent claim 25

The following is an examiner's statement of reasons for allowance:

In regards to claim 24, prior art fails to disclose a phosphor substrate comprising nitride containing at least one element selected from Group XIII (IUPAC 1989) having a general formula X-N, wherein X is at least one element selected from B, Al, Ga and In, a general formula XN:Y, wherein X is at least one element selected from B, Al, Ga and In, and Y is at least one element selected from Be, Mg, Ca, Sr, Ba, Zn, Cd and Hg, or a general formula XN:Y,Z, wherein X is at least one element selected from B, Al, Ga and In, and Y is at least one element selected from Be, Mg, Ca, Sr, Ba, Zn, Cd and Hg, and Z is at least one element selected from C, Si, Ge, Sn, Pb, O and S, wherein said phosphor substrate has a surface dislocation density of  $10^6/\text{cm}^2$  or less and the full width at half maximum of the X-ray diffraction from the surface plane of 300 arcsec, or less, and contains alkali metals at the concentration of 0.1 ppm or more.

In regards to claim 25, prior art fails to disclose A phosphor substrate comprising nitride containing at least one element selected from Group XIII (IUPAC 1989) having a general formula XN, wherein X is at least one element selected from B, Al, Ga and In, a

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general formula  $XN:Y$ , wherein X is at least one element selected from B, Al, Ga and In, and Y is at least one element selected from Be, Mg, Ca, Sr, Ba, Zn, Cd and Hg, or a general formula  $XN:Y,Z$ , wherein X is at least one element selected from B, Al, Ga and In, and Y is at least one element selected from Be, Mg, Ca, Sr, Ba, Zn, Cd and Hg, and Z is at least one element selected from C, Si, Ge, Sn, Pb, O and S, wherein said phosphor substrate has the off-angle between 0.05 and 0.2 degree.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 8 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 8, line 2 recites "with said Y or said Z" is vague and indefinite because when the formula  $XN$  is chosen from claim 1 there is no Y or Z variables.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 11, 13, 15 and 17-20 rejected under 35 U.S.C. 102(e) as being anticipated by D'Evelyn et al. (2004/0031978).

In regards to claim 1, D'Evelyn et al. teach a phosphor substrate prepared by crystallization from supercritical ammonia-containing solution, wherein said phosphor substrate comprises nitride containing at least one element selected from Group XIII (IUPAC 1989) having a general formula  $XN$ , wherein X is at least one element selected from Ga (see abstract). Also note: the limitation "prepared supercritical ammonia" is a limitation on a method of making, not on the final structure of the device.

In regards to claims 11, 13, 15 and 17-20, D'Evelyn et al. teach a phosphor substrate has a surface dislocation density of  $10^6/\text{cm}^2$  or less (abstract) and crystal structure of a wurtzite ([0030]), wherein a cap layer in the form of GaN ([0037], fig. 1, 12), , wherein said phosphor substrate is a single crystal substrate on which a gallium nitride crystal can be grown in the vapor phase ([0021] and [0032] also note: the limitation "grown in the vapor phase " are limitations on a method of making, not on the final structure of the device), wherein a light emitting device can excite said phosphor substrate set within the ultraviolet region ([0035]), wherein at least one phosphor layer is provided on said phosphor substrate ([0013]).

Claims 1 and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Motoki et al. (Applied Pys. Vol. 40, 2001 as in IDS filed 12/19/2005).

In regards to claims 1 and 12, Motoki et al. teach a phosphor substrate prepared by crystallization, wherein said phosphor substrate comprises nitride containing at least

one element selected from Group XIII (IUPAC 1989) having a general formula XN, wherein X is at least one element selected from Ga (see abstract, also note: the limitations "prepared by supercritical ammonia" are limitations on a method of making, not on the final structure of the device) wherein said phosphor substrate has the full width at half maximum of the X-ray diffraction from the surface plane of 600 arcseconds or less (abstract).

Claims 1 and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Suda et al. (US patent no. 6,531,072)

In regards to claims 1 and 16 Suda et al. teach a phosphor substrate prepared by crystallization, wherein said phosphor substrate comprises nitride containing at least one element selected from Group XIII (IUPAC 1989) having a general formula XN, wherein X is at least one element selected from Ga (col. 3, lines 10-45, also note: the limitations "prepared by supercritical ammonia" are limitations on a method of making, not on the final structure of the device) wherein said phosphor substrate consists of GaN:Zn (col. 3, lines 10-31).

Claims 1 and 18-20 and 22-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Mueller et al. (WO 01/24284).

In regards to claims 1, 18-20 and 22-23, Mueller et al. teach a phosphor substrate prepared by crystallization, wherein said phosphor substrate comprises nitride containing at least one element selected from Group XIII (IUPAC 1989) having a



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general formula XN, wherein X is at least one element selected from Ga (pg. 5, lines 24-31, also note: the limitations "prepared by supercritical ammonia" are limitations on a method of making, not on the final structure of the device), wherein said light emitting device can excite said phosphor substrate (pg. 5, lines 24-31), wherein the light emitting wavelength region of said light emitting device is set within the ultraviolet region (pg. 6, lines 3-9), wherein at least one phosphor layer is provided on said phosphor substrate (pg. 6, lines 15-27), wherein said light emitting device is able to emit the white light by mixing the light emitted from said phosphor substrate and a part of the light emitted from said phosphor layer (abstract).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over D'Evelyn et al. (2004/0031978) and further in view of Dwilinski et al. (publication "Ammono method of GaN and AlN production" Diamond and related materials 1998 as cited in IDS on 11/16/2004).

In regards to claim 10, D'Evelyn et al. differ from the claimed invention by not teaching wherein the roughness of said phosphor substrate surface is 10 Å or less.

Dwilinski et al. teach wherein the roughness of said phosphor substrate surface is 10 Å or less (pg. 47, col. 1, "3. GaN crystals and their properties", paragraph 1).

Since both D'Evelyn and Dwilinski teach crystal formation, it would be obvious to one of ordinary skill in the art to have the surface roughness of the crystal of Dwilinski in the crystal of D'Evelyn because it would give the crystal more desirable properties for a light emitting substrate.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Pertinent prior art is closely related art that individually or in combination could be considered grounds for rejection. See references cited for a listing of the pertinent prior art found and the prior art found.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael J. Logie whose telephone number is 571-270-1616. The examiner can normally be reached on 7:30 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on 571-272-2293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. J. L./  
Examiner, Art Unit 2881

**/ROBERT KIM/**

**Supervisory Patent Examiner, Art Unit 2881**